ABSTRACT OF THE DISCLOSURE

Electro-optic Devices, including Modulators and Switches

An electro-optical device capable of modulating the amplitude or phase of an optical output in response to an electrical data or control signal, or of switching it, has reduced frequency-dependence and a better combination of operating voltage and bandwidth. It comprises a body of electro-optically active material, waveguides for passing light through the body, and electrodes for applying an electric field with a frequency in the microwave region to the body, and its transverse geometry is such as to maintain adequate phase velocity matching between optical and microwave frequencies. There is a discontinuity in either the body or at least one of the electrodes such that the direction of the electro-optic effect is reversed for a portion of the length of the device at or near its downstream end.

The result of such a discontinuity (in combination with phase velocity matching) is that the device operates in three successive zones: in the upstream zone, desirable phase change is induced for all frequencies in the bandwidth of the device; in the middle zone, desirable phase change is induced for frequencies in the upper part of the bandwidth, but phase change in the lower frequencies becomes excessive; while in the downstream zone, there is no significant phase change in the higher frequencies but the excess change at lower frequencies is reversed.